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ABSTRACT

Because language arts processes and related skills depend on thinking processes, teachers should know, use, and guide creative problem-solving processes in their language arts class. Creative problem solving involves a balance of divergent and convergent thought, reflected in the processes of creative and critical thinking. Divergent, or creative, thinkers defer judgment while looking for and accepting many ideas. Critical thinking involves the highly conscious use of standards to make judgments. Although both aspects are involved in the problem solving process, the divergent, creative aspects should be developed first to avoid killing the needed brainstorming portions of creative problem solving with critical judgment. Students use various styles of creative/critical thinking in problem solving and they can be grouped as follows: (1) rigidly inhibited thinkers, who have difficulty understanding ideas and are concrete in their verbalizations; (2) undisciplined thinkers, who distrust others' ideas and are quick to criticize them; (3) acceptance-anxious thinkers, who tend to unquestioningly accept the opinions and ideas of others; and (4) creative thinkers, who value and learn from their own and others' ideas. Although schools tend to reinforce only the acceptance-anxious style, language arts teachers can encourage all children to develop critical thinking skills by examining the conflicts and behavior inherent in literature and by discussing the problems and possible solutions in the invented situations of the story. (Eight references are appended.) (MM)

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CRITICAL THINKING IN PROBLEM SOLVING:

A PERSPECTIVE FOR THE LANGUAGE ARTS TEACHER

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When teachers know, use, and can guide a creative problem-solving process, the results for the language arts are many. Results include integration, such as in the use of critical processes and skills (not merely carpingly critical, but harnessed productively to a genuine decision point). Results also include high motivation, and an economical use of classroom time.

Why? Because behind language arts processes and related skills lie those of thinking. Rather than fragment thinking skills (e. g., into 144 separate units), a teacher can focus on the few processes. These are association, deduction/induction, creative production, and critical evaluation, all of which are subsumed under the processes required for productive problem solving.

Creative problem solving. Problem solving is optimally **creative** when it employs a balance of divergent and convergent thought while moving toward a goal. Learning is highly productive when students autonomously find problems themselves (with some teacher guidance). These are problems

the student can relate to, problems that have room for exploration. "Exploration room" means that there are some unknowns in the problem and in its answers. In this creative problem-solving context, teaching and learning become cooperative adventures in which teacher and child jointly, singly, and in small groups set out to solve problems (Lundsteen, 1983).

As applied to thought processes, the terms **creative thinking** and **problem solving** represent certain similarities and differences. Problem solving has a creative component. The contrast between the two lies in the greater part played in creative thinking by the following aspects: novel insights; illumination (ah-ha!); lucid expression; the insinuation of less-conscious fringe thoughts; emotion; and fantasy--playlike, free-rising, fanciful, and dreamlike.

Problem solving has a planful, procedural component. Problem solving (in contrast to pure creative fantasy) depends on careful, conscious preparation, organization, direction, and verification. It is both more factual and more goal-oriented. For example, a prepared teacher usually asks questions in the language arts classroom designed to elicit divergent and then convergent (or critical) thinking. Such thinking may be about missing data, procedural steps, multiple alternatives, and consequences. The two processes (the playfully creative and the goal-oriented) can occur closely together.

The creative dimension of problem solving helps students in making and in communicating meaningful new

connections. Its divergence helps them: 1) think of many possibilities, 2) think and experience in varied ways, 3) think of new and unusual possibilities, 4) generate and select alternatives.

When do children need creative problem solving? When they want to develop something new, or do something but are not certain what and how, or want innovation in planning or implementing, or when they have an opportunity without knowing just how to take advantage of it, or when they have a concern and do not know how to handle or respond to it, thus needing new ideas and possibilities. They do not need creative problem solving when they already know what to do, and how and when to do it (Treffinger, 1984).

Students who are using successful divergent thinking in problem solving are deferring their judgment (not evaluating prematurely so as to cut off thought). They are looking for and accepting many ideas. They are stretching "way out" for ideas, taking time to let ideas "simmer." And they are seeking for combinations, hitch-hiking on their own ideas and ideas of others.

Steps of problem solving may be listed as follows: 1) **Becoming aware of a problem**, 2) **Gathering information**, 3) **Pinpointing a problem area** ("In what ways might this situation be improved..."), 4) **Finding ideas** (and hypothesis making), 5) **Finding an acceptable solution** (criteria applied to outcomes), and 6) **Acceptance finding**. Here the problem solver may consider possible sources of assistance and especially resistance to the solution, identifying pitfalls

in potential implementation steps, and specific plans. There may be a spiraling back and reusing of the process steps as the individual senses new challenges.

Critical thinking. How is critical thinking distinguished? Critical thinking is distinguished from the other processes by the highly conscious use of criteria, or standards, which may be either internal or external (consensual data). Individuals and groups make judgments in light of this highly conscious application of standards. This "criterion idea" is found in the Bloom taxonomy of educational objectives (1956), the work of Guilford (1964), and Russell's classic book, Children's Thinking (1956).

Where are the critical thinking aspects found in problem solving? The problem-solving process has aspects of convergent thinking and of critical thinking all along the way.

The intentional, convergent, critical, evaluative dimensions in problem solving help students in several ways. Of course such dimensions help them select a most promising hypothesis for solving, and help them to choose a most important and useful criterion for shaping the hypothesis into a solution. But convergent, critical thought processes are also useful in other steps or choice points along the process. Such places may be the initial exploration and sensing of some dilemma where convergently a student accepts a challenge and systematically undertakes effort to respond. Another such place may be the identifying of the most important facts, conditions, and data. Another may be the

selecting of a working problem statement. Yet another place critical thought may be helpful is in the commitment to finding acceptance for the focused and prepared solutions.

Students who are successfully using convergent, critical thinking in problem solving display several qualities: 1) being deliberate and explicit; 2) avoiding snap judgments and premature closure; 3) looking out for their biases, blind spots, and prejudices; 4) being constructive in their criticism (not pickily critical); and 5) holding fast to the focus of their goals (Isaksen & Treffinger, 1985).

In summary, critical thinking aspects are found throughout the problem-solving process. But a warning is to work the divergent, creative aspects first, nurturing them and thus avoid killing the needed brainstorming portions of creative problem solving by stepping in too early with critical judgment or thinking (however important these may be in the process).

Styles in Critical and Creative Thinking in Problem Solving.

Although we may speculate about a generic problem-solving process, and find it useful to bring it to a level of awareness in our classrooms where it impacts on growth in language arts, we need to remember that individuals use this process. And individuals vary. Individuals may approach this process with varied styles or persisting patterns of behavior.

Some styles help a problem-solving process and its creative and critical thinking along its way. Some hinder. Some are at cross purposes (interpersonally speaking) when

the endeavor belongs to a group. The following is based on the ideas of Rosenberg, and fuller discussion is in the original chapter. The four styles he describes are: 1) Rigid-inhibited, 2) Undisciplined, 3) Acceptance-anxious, and 4) Creative. (Rosenberg, 1968).

Some rigidly inhibited children have difficulty understanding ideas or looking to themselves for thoughts, opinions, and are very concrete in their verbalizations. Obviously, critical thinking, with its implied examination of alternatives, is difficult for them. Other children, undisciplined in their relations with others, tend to distrust others' ideas and find it all too easy to criticize and "put down" the suggestions of others. While they are using critical thinking, it is not harnessed to constructive goals. Other children, who are especially anxious to be accepted, may tend to accept the words of others too readily, while not looking at their own ideas and opinions. Thus they have difficulty in establishing standards against which to evaluate others' ideas in a critical light.

For the fortunate children who are creative enough to value and learn from both their own and others' ideas, we can expect highly productive critical thinking. This prowess includes: the ability to abstract ideas, to weigh facts and opinions, to be assertive enough to offer constructive ideas and critical comments, and to be socially oriented enough to work positively and productively toward individual and group goals.

Schooling may respond to the display of styles in

varied ways. Schools may tend to reinforce the Acceptance Anxious style, with one right way to do everything and the emphasis on the quiet classroom. Schools may ignore the Rigid Inhibited (whose plight is the worse). Schools may harshly repress the Undisciplined without bringing along a valuing of external sources of information and recognizing strengths in private projects. Finally, schools may squelch the Creative style for being too innovative (Lundsteen, 1985).

The use of critical thinking in discussing literature.

Literature can be used throughout the language arts program from the youngest children to the oldest to present a whole host of challenging problems. The conflicts and behavior inherent in literature are grist for the mill: Teachers can encourage students to express their questions and opinions about the invented situations in the story. Teachers, too, can stimulate the children to consider if the character behaved in an appropriate manner, or if the problem could have been resolved differently. Once there is more than one possibility for solving recognized (the author's presented one and the child's response, for example), there is room to consider alternatives, and in so doing, we can be fostering critical thinking. What were the different events that might be considered problematic for the main character and why do they fit? What was the main problem and why do you think so? What could be done to try to help, and in what ways would this alternative help (or hinder) the character?

The steps used by a classroom teacher to discuss a story could be:

1. **Read the story, or part of a story.** The author's resolution may be given, or the reading may stop at the point where a problem or problems have been indicated, but not the solution. ("Cliff-hanging" episodes, we sometimes call them.)

2. **Discussion begins with a warm-up and general talk about the story.** Information about the characters and situation are laid out. During this time problems will surface in the conversation.

3. **The general problem is pinpointed.** This usually refers to the main conflict. In order to synthesize ideas and choose an over-all problem, students need to look at the various ideas offered during the first part of the discussion more closely. Here critical thinking is involved.

4. **Possible solutions are offered.** While diversity of ideas is to be encouraged at this time, there will be some critical reactions from some of the students as ideas are tossed around and considered.

5. **A solution is chosen by the student.** Since many possibilities for solving the problem are possible, this may be a good time to stop talk and allow the students to work individually. They may respond by writing a script which would describe what would happen if the characters adopted the student's chosen solution. Another might write a more personal account of a similar problem experienced, along

with its resolution.

CONCLUSION

BY the end of such a discussion, most of the children would be able to identify with the problem and experience parts of the process in some way. It can be helpful to them to feel that personal problems are not unique and that most people have the same sort of problems at some time in their lives. Children can learn to be persistent (to "stick to it"), to feel free to be original and open-minded, to respect their feelings and those of others, to empathize ("get into another's skin"), to think of reasons, to harness critical thought productively, and to prepare for a demanding world that needs skilled creative problem solvers.

As a rising tide says, "Hey, we gotta teach problem solving and critical thinking processes," then exercises, text pages, ditto sheets, and workbook paragraphs for it are likely to proliferate. Beware. These processes are not reducible to such media. We need to provide far more than textbook pages. Use, genuine use, needs to reflect student interests, concern, ownership, and autonomy--as much as possible. Creative problem solving and its critical thinking demand that the individual apply energy and relational thinking over a sizable period of time. However, creative problem solving is of utmost value for it productively harnesses critical thinking (rather than letting it become negativistic); and it can be a highly motivating, integrating, and economical focus for a language arts program.

Lundsteen (NCTEPS, Crit. Think. in P. S., refs.)

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